Applying Space-based Technology and Information and Communication Technology to Strengthen Disaster Resilience

Presentation by

Yusuke Muraki

Infrastructure Specialist (Space Technology)

Asian Development Bank

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Innovation and Partnership

- Innovation - Data collection
  - Use of Space-Based Technology (SBT) and Information and Communication Technology (ICT)
  - Crowdsourcing

- Partnership
  - With Japan Aerospace Exploration Agency (JAXA)

OpenStreetMap (OSM)

- Free and open maps developed by volunteers based on satellite data and GPS.

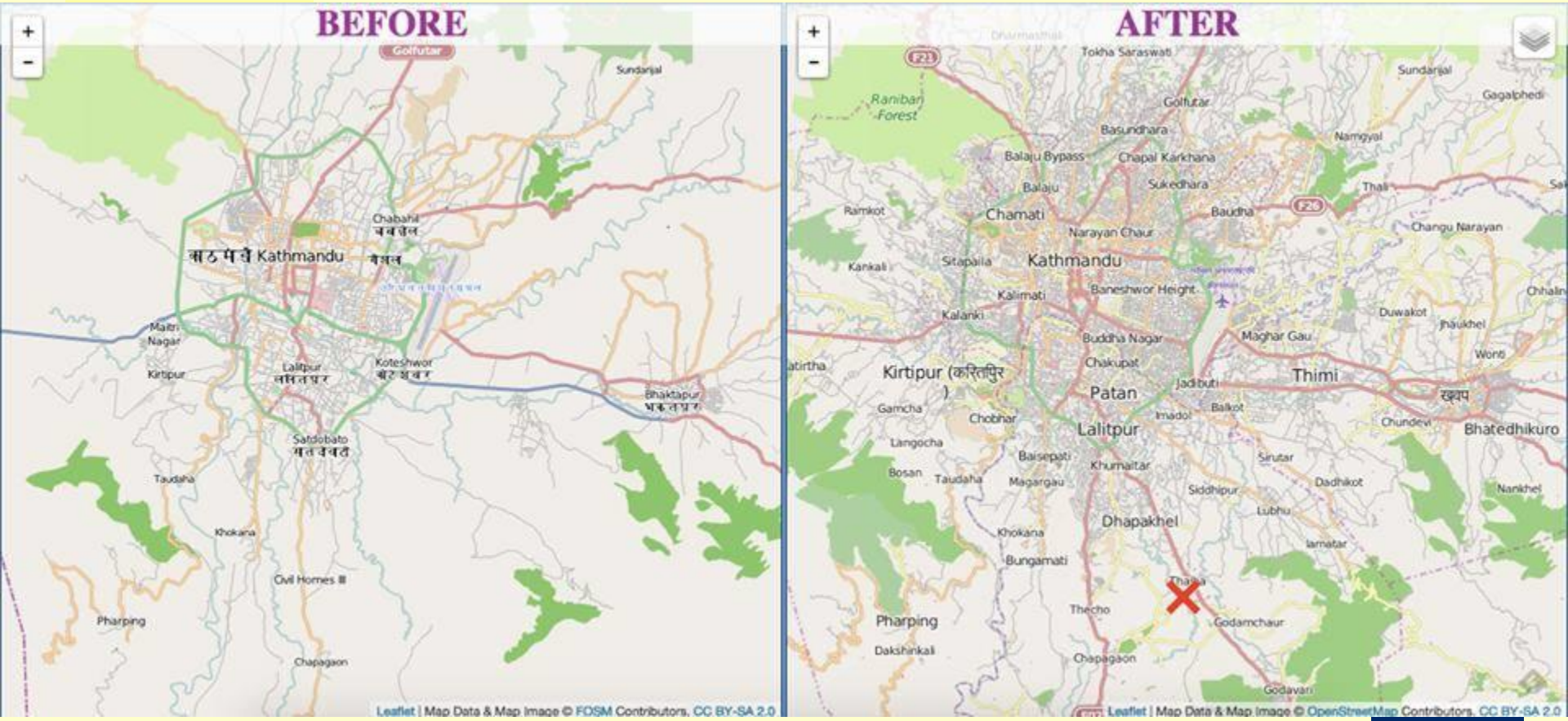
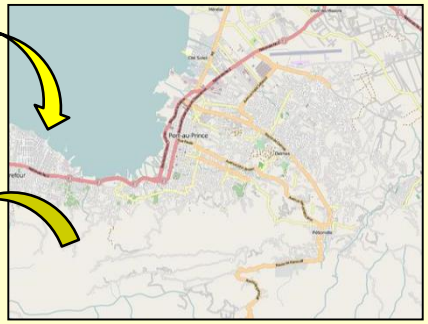
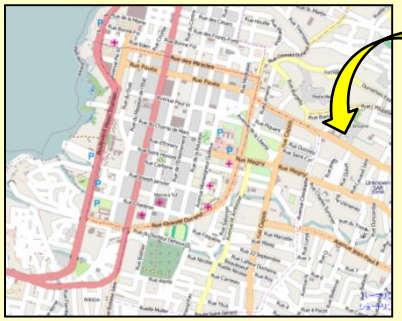


Image Credit：Mr.Dongpo Deng

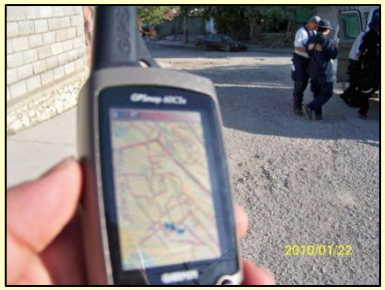
Crowdsourced mapping using IT tools

Map development from GPS and satellite data on PC





Fieldwork with mobile phone with GPS



ADB

Satellite-based Damage assessment (Number of damaged infrastructure)

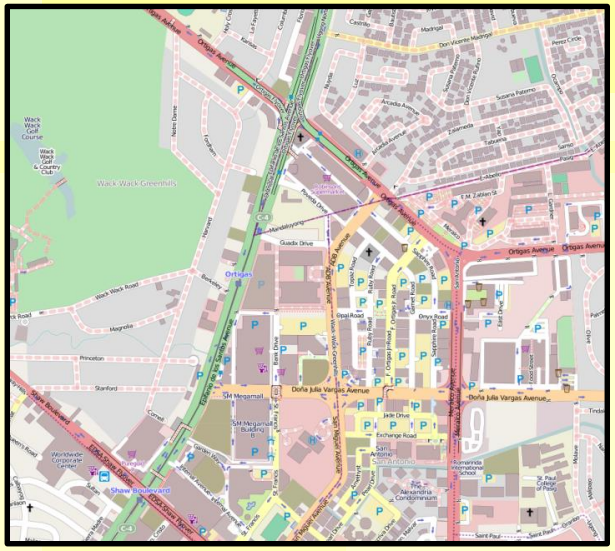


Image from Openstreetmap

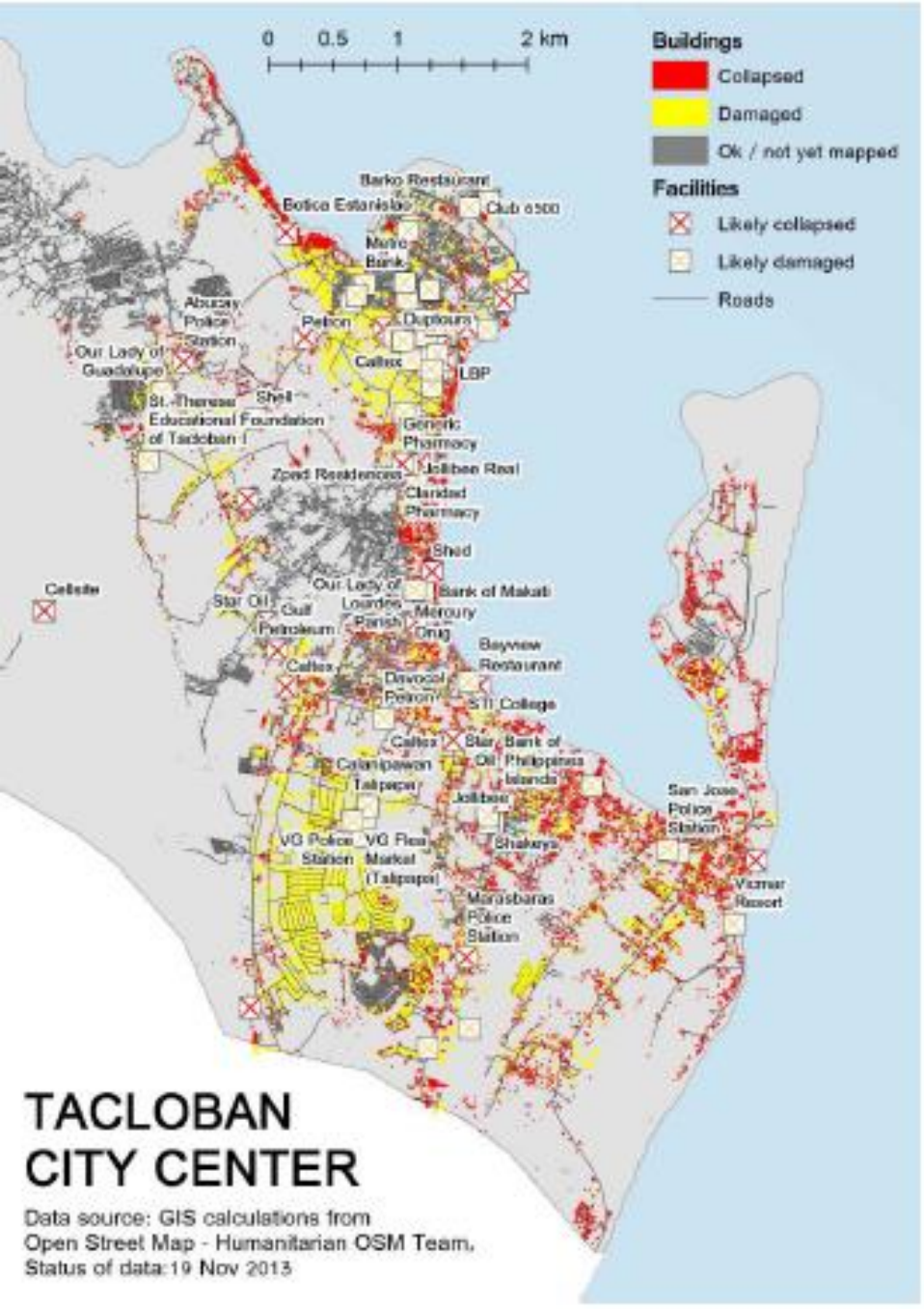
GIS Analysis

Image from International Charter

Base maps
(Layers of houses, infrastructure, roads, etc.)

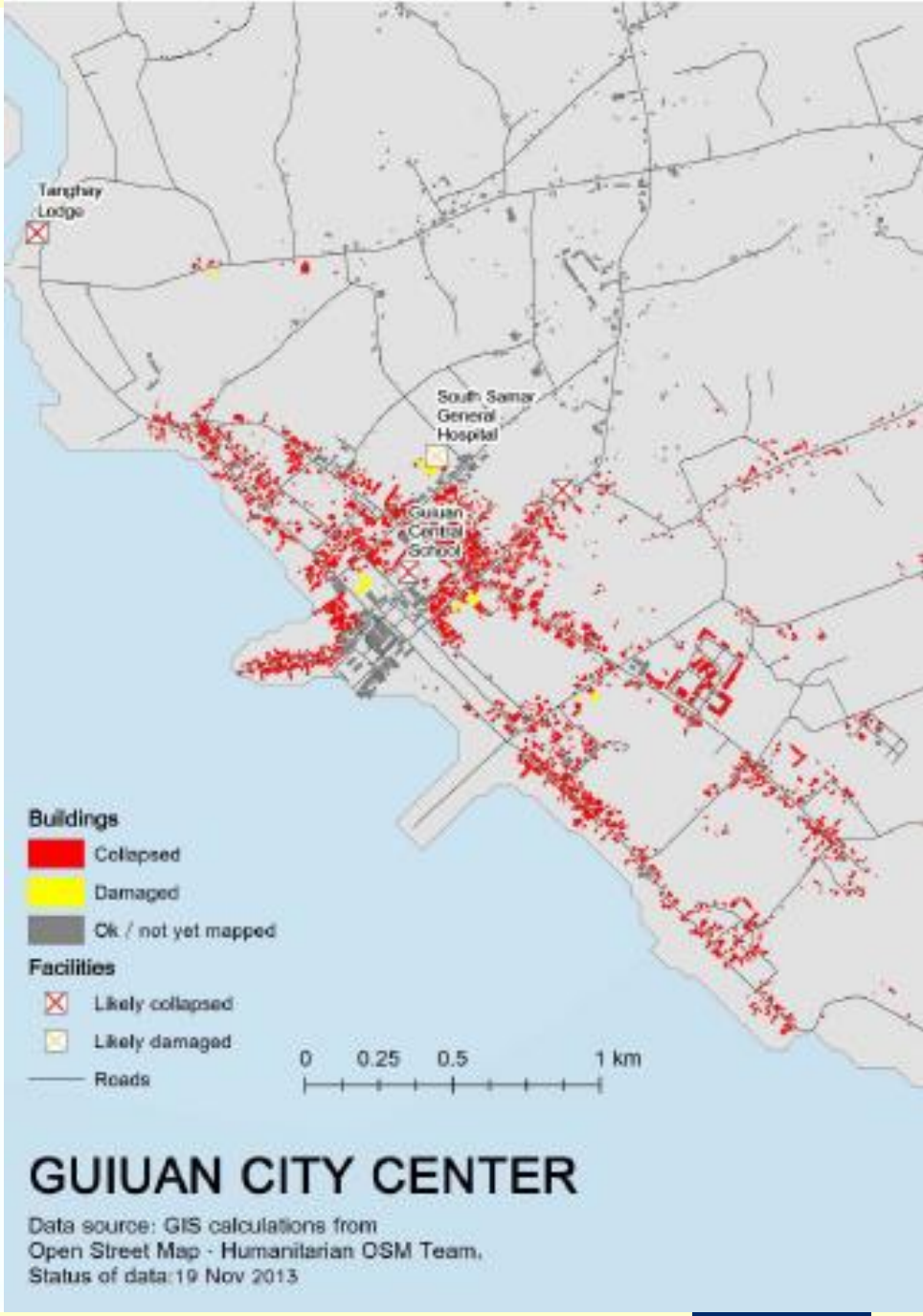
Damaged infrastructure by visual check of satellite imagery

1. Number of damaged infrastructure by building type
2. Damaged infrastructure maps



TACLOBAN CITY CENTER

Data source: GIS calculations from Open Street Map - Humanitarian OSM Team.
Status of data: 19 Nov 2013



GUIUAN CITY CENTER

Data source: GIS calculations from Open Street Map - Humanitarian OSM Team.
Status of data: 19 Nov 2013

Table 1: *Buildings collapsed or damaged (mapping status as of 19 Nov 2013)*

Buildings	Tacloban	Guiuan	Daanbantayan	Roxas	Bantayan	Grand Total
Collapsed	11931	4189	1125	555		17800
Damaged	8235	24	1170	476		9905
Ok / not mapped	13185	2909	4940	15000	16656	52690
Grand Total	**33351**	**7122**	**7235**	**16031**	**16656**	**80395**
Total affected	**20166**	**4213**	**2295**	**1031**	**0**	**27705**
% affected	**60%**	**58%**	**32%**	**14%**	**0%**	**34%**

Table 2: *Facilities collapsed or damaged (mapping status as of 19 Nov 2013, proximity to collapsed or damaged building)*

	Tacloban		Guiuan		Daanbantayan	Roxas City	Grand Total
Facility	*Collapsed*	*Damaged*	*Collapsed*	*Damaged*	*Collapsed*	*Damaged*	
Attraction	3	3					6
Bank	3	8					11
Bus station		1			1		2
Entertainment	1	2					3
Ferry terminal					1		1
Gas station	5	9	1				15
Hospital	1			1			2
Hotel		13	1			1	15
Pharmacy	5	5					10
Police	2	2					4
Religion	1	5					6
Restaurant	4	17			1		22
School	1	5	1				7
Shopping	1	2					3
University						1	1
Grand Total	**27**	**72**	**3**	**1**	**3**	**2**	108

Could calculate the number and locate the damaged hospitals, hotels, schools, etc. on maps

ADB

Benefit of satellite-based damage assessment

- Number of damaged houses for Tacloban city from the results was 20166 / 33351 (60%)

- Number of damaged houses for Tacloban city reported in NDRRMC update was;
  - 382 for 11/10 to 11/21
  - 58,823 (12,270(Totally), 46,553(Partially)) for 11/21 to 12/20

Satellite-based assessment has advantage for the quick assessment until field data is available

ADB

Project Overview

- TA-8884 REG **"Applying Space-based Technology and Information and Communication Technology to Strengthen Disaster Resilience"**

- JFPR funded, 2 million US$

- Pilot countries; **Armenia, Bangladesh, Fiji, Phlippines**
- For 2 years (2015/4 to 2017/3)

- Impact:More information-based DRM
- Outcome: Improved quality and timeliness of information for disaster preparedness and response using SBT and ICT in the pilot countries

Satellite Imagery

Tracing satellite imagery on PC

Uploaded to OSM Maps

Smartphone with GPS

-Validate and edit maps
-Add building names and types

(i) Community-based OpenStreetMap base map development

Smartphone with GPS

-geo-tagged information about hazards and evacuation route

(ii) Community-based hazard risk and evacuation mapping

Smartphone with GPS

-geo-tagged reports and photos from field

(iii) Crisis mapping

Other available maps, data, hazard maps

(iv). Utilization of satellite-based damage assessment

From Sentinel Asia, the Disaster Charter

Satellite Imagery → Satellite-based damage data

(v). Data Mgt. using GIS at the local government

Smartphone and tablet with GPS

(vi). Utilization of data at community level for disaster risk reduction, response and recovery

Conclusion

- Mobile phone technology and space technology can provide cost effective innovative solution for disaster risk management.

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